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modern world, with its demands for more democracy and at the same time more efficiency, the teacher is hard pressed. The whole modern world, but especially the school, needs a new insight into the concrete processes of the developing self. The laboratory can offer detached fragments of isolated cases; the older analytic psychology can offer some general suggestions on mental processes: these are good when they can be seen in their concrete setting in the actual course of the child's developing experience. But they are decidedly bad, as Münsterberg has shown, when they are taken as final statements of processes and blindly followed without thought as to the organic relationships they sustain to the rest of the developing experience of the victim. Social psychology is the modern attempt to reintegrate the experiences of the individual, to present that experience in concrete forms, with as much richness of detail as the analytical psychologist and the laboratory operator can furnish. For while the experimentalist is a good man to go to for data as to detailed operations, it is only as he leaves his laboratory to find his problems, and takes his results back into the social world, there to reinstate them concretely in the flow of living human experience, that he can truly be said to be a real psychologist.

The hope for the schools and for education generally, even the very hope for democracy itself, lies in making the teacher conscious of the processes of development as these are being restated in terms of social psychology. The teacher will have, must have, psychology of some kind; the only relief from the intolerable psychology which Münsterberg so rightly criticizes is found in the social psychology which can see the child as child, and also as mechanism; that is, as *end* of education and as *means* to education, at the same time. The educational psychology of the future must be a genuinely social psychology.

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## SOCIETIES

### TWENTIETH MEETING OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION

THE twentieth annual meeting of the American Psychological Association, held in Washington, D. C., December 27, 28, 29, 1911, in affiliation with the Southern Society for Philosophy and Psychology, was of rather unusual interest. The fact that it was the twentieth meeting brought up reminiscences regarding the founding of the association and rather gratifying reflections on the growth

of psychological science in America. At the smoker given by Professors Franz and Reudiger at the New Fredonia Hotel on Thursday evening, following President Seashore's address, the company fell into a reminiscent mood and called on President Hall, Dr. Ladd, and Professors Cattell and Münsterberg for speeches as to the early history of psychology in America. This occasion and the luncheon given by Dr. Franz at the Government Hospital for the Insane on Thursday made up the social features of the meeting. The program contained several unusual features, including double sections, a large exhibit of apparatus, advanced abstracts of the papers read at the symposium on instinct and intelligence, and the conference on psychology and medical education. Special sessions were given over to mental tests, animal behavior, medical education, experimental psychology, general psychology, and educational psychology. Taking the program as a whole, it is fair to say that applied psychology bulked larger than any other topic, one third of the more than sixty papers being devoted to various subjects falling in this field, an evidence that the day of the consulting psychologist is about to come.

The symposium on instinct and intelligence opened the meeting, Mr. Marshall being the first speaker. He considered the activities of animals from two view-points, the subjective and the objective. Speaking from the latter point of view he divided the activities of animals into two groups, one characterizing the simplest animals and the other the complex animals. The first group of activities display: (1) evident biologic value; (2) directness; (3) immediacy; (4) "perfect very first time"; (5) non-modifiability; (6) innateness. The second group are not evidently of biologic value, are indirect, hesitant, highly modifiable, not evidently innate and not "perfect the very first time." But in complex animals there are certain activities of the first sort and these occurring in the midst of activities of the other sort may be called "instinct-actions." They may be regarded as due to the instinct actions of the cells and this cell instinct-action may be looked upon as the biologic unit. But these varied activities due to the compounding of instinct actions are what we call intelligent activities. Hence, we argue that intelligence is statable in terms of "instinct feelings," the psychic correspondents of instinct actions. If we could grasp the full psychic significance of an instinct-feeling, by slowing down the process, we should find in it all the essentials of intelligence; and if intelligent acts could be made immediate, they would appear objectively as "instinct-actions" and subjectively as "instinct-feelings."

Mr. Herrick held that the term instinct as popularly used is incapable of scientific definition. He would replace the terms instinct and intelligence by the terms innate action and individually

variable action, and maintained that these two types of action are separate biological functions, both of which are exhibited in some degree by all animals, and that they are individually variable. Under innate action, he would include the fundamental physiological properties, tropisms, taxes, reflexes, compound and chain reflexes, and the inherited elements of all higher behavior complexes. Under individually variable action he would include all non-heritable, acquired behavior from simple, physiological modifications resulting from practise at the lower extreme to learning by experience and the higher intelligent adaptations at the other extreme. A special mechanism has been differentiated for the higher forms of variable action, namely, the association centers of the brain.

Mr. Yerkes held that instinct and intelligence are two functional capacities or tendencies of the organism and that neither has developed from the other. Now the one and now the other predominates in the life of the organism or the species. No organism lacks either the instinct capacity or the intelligence capacity. Instinctive activities are practically serviceable on the occasion of their first appearance, strikingly perfect in important respects, predictable, heritable in definite form, and suggestive of experiences which the organism has not had. Intelligent activities, by contrast, are serviceable as the result of trial, practically unpredictable, not definitely heritable, and suggestive of experiences that the organism has had.

Mr. Judd emphasized the importance of defining intelligence in positive rather than negative terms. It is by intelligence that an organism becomes superior to its environment and capable of modifying its environment. It is the power of initiating activities from inner motives; and the intelligent individual, instead of reacting upon objects in a manner determined by their sequence in nature, is able to bring objects distant in time or space into close relation with each other. This bringing together of remote objects is the result of inner processes of comparison or association, which group of processes marks the highest stages of evolution.

The conference on psychology and medical education was opened by Dr. Franz, who spoke on the present status of psychology in medical education and practise. The recent favorable growth of psychology in connection with medical affairs was held to be due to the realization of the importance of psychiatry and to the success of non-medical healers. In most schools, the speaker thought, psychological matters are discussed in the courses in physiology, psychiatry, neurology, and medicine. Psychology was held to be of value to research in psychiatry and neurology, and also in pharmaceutical studies. To the physician psychology has its chief value in the consideration of mental diseases, in both diagnosis and treat-

ment. It is also of value to all physicians because they must depend upon mental processes for diagnosis and for the estimation of the effects of remedial agents. This subject, which is so important for all physicians, can not be picked up incidentally, but there must be given some special attention to it in the medical course.

Dr. Adolph Meyer spoke on the practical relation of psychology and psychiatry, holding that both fields are open to expansion. He spoke of a psychology that will cope with the problems of introspection and also with the other problems dealing with the biological, physiological, and even anatomical conditions of mental life. It is the psychologist alone who can deal with the great borderland that lies between the physiology of special organs and the behavior of personalities. Psychiatry is forced to deal with psychological material. It determines mental facts partly as symptoms of diseases back of the conditions and partly as biological reactions of the type of mental integration, which, like suggestion, once induced, play a more or less well defined dynamic rôle. The first task is to describe critically the plain events of abnormal reactions and conduct as experiments of nature for the conditions under which they occur, the subjective and objective characteristics which allow us to differentiate the reactions from one another, the events and results in the conduct and life of the person, the dynamic factors and their modifiability, the time and influences needed for a readjustment of a state of balance. With this rule of formal technique and logical arrangement of the inquiry, we are bound to get sound common ground for a psychiatry which aims merely at the identification of given conditions with accepted disease-processes, and also for a dynamic pathology which gives psychobiological data a dynamic position.

Dr. E. E. Southard contrasted the problems of teaching and research in the fields of psycho- and neuro-pathology. He insisted first on the unique value of the pathological method, not merely for the diagnostic and therapeutic purposes of medicine, but for biology as a whole and for the most vital of the biological sciences, psychology. He pointed out the perniciousness of psychophysical parallelism in the discussion of matters psychological because it inhibits the free interchange of structural and functional concepts and the passage to and fro of workers in the several sciences. He pointed out that psychology and physiology have more in common than either has with such structural sciences as anatomy and histology and that the main common element of both mental and cerebral processes is the time element as against the space element of the structural sciences. He conceived that the mind twist and brain spot hypotheses for the explanation of certain forms of mental dis-

ease are entirely consistent with each other, since from a different angle each is dealing with the same facts.

Dr. Watson gave the outline of a proposed course in psychology for medical students. The course might be given as an elective in the second or third year of the medical school and should occupy two laboratory periods per week and one lecture. The course would presuppose a thorough course in elementary psychology as a part of the student's premedical training and would deal with the objective material of psychology. Such topics as the following should be considered: visual and auditory sensation, thorough tests and application of the Binet-Simon system, work in mental and muscular fatigue, acquisition of skillful acts, learning plateaus, conflicts, stamping in and retention of wrong methods of response, association, memory and retention, association method of Jung, reaction time. The aim would be not only to supply information regarding these subjects, but also to give training in the objective study of psychological processes and to prepare the student for the work of the clinic and the study of hypnotism, multiple personalities, aphasia, etc.

Dr. Morton Prince doubted the value of the teaching of structural psychology to the medical student already almost submerged in the number of subjects he is called upon to master. He thought normal psychology should be to pathological psychology and psychotherapeutics what physiology is to pathological physiology and physiological therapeutics; but to attain this position, processes and mechanisms should be elucidated rather than structure. He insisted that the professional psychologist has not occupied himself sufficiently with this sort of research and consequently the applications of psychology lagged far behind other applied sciences. He advocated what he chose to call "a new psychology" for the medical student, the chief features of which he outlined as follows: the subconscious, hypnosis and allied conditions; suggestion and its phenomena; memory as a process; amnesia and its mechanisms; fixed ideas, conscious and subconscious; dissociation and synthesis of personality; emotions as dynamic forces; instincts as impulsive forces; sentiments as complexes of ideas and emotions; phenomena of conflicts, repression, resistance, inhibitions; mechanisms of thought; attitudes of mind; associative processes and reactions; habit processes; automatisms; mechanism of dreams; influence of mind on the body; fatigue.

This course Dr. Prince insisted would supplement the course suggested by Dr. Watson and should be taught in the premedical course.

In respect to this program Dr. Meyer thought that the college curriculum should not preempt the field of psychopathology, unless it has clinical material to work upon.

The discussion which followed the reading of the papers was

prompt and was engaged in by an equal number of physicians and psychologists. In general it centered about three topics: first, emphasis on the importance of psychology to the medical student; second, the kind of psychology that should be given; third, the time and place to be given to psychology in the medical and premedical program. The following quotations were significant of the whole discussion.

Dr. Jelliffe: "Let us picture to ourselves the medical student of the remote future. Diseases of the body will be prevented and there will be three functions for the medical practitioner; to deal with the preservation of the species, with senility and with mental aberration. There will be the obstetrician and pediatrician, the specialist in old age, and the psychotherapist. If the problems of mental activities are to occupy such a large share in the future, the subject of psychology should bulk large in the medical curriculum."

Professor Angier gave an outline of the course given to medical students at Yale and insisted that it would be "unwise for a man to go into medicine or into psychotherapeutics particularly and not be acquainted to some extent with normal psychology."

Dr. Hoch: "It is quite evident that the importance of mental factors, not only so far as psychiatry is concerned, but so far as all diseases are concerned, is being more and more appreciated. Physicians need much more training than at present, not only in psychiatry, but also in other branches, but the more marked need is along mental lines. We must not forget that common disorders that come to the physician and are looked upon as essentially physical would sometimes be much better treated from a mental point of view."

The speaker commended the course outlined by Dr. Watson, but doubted whether there would be sufficient time for it. He rather favored the course suggested by Dr. Prince.

Professor Haines emphasized the fact that "the psychology that the physician is coming to use is departing in no radical way from the psychology in which members of this association have been interested. We must not forget that at bottom psychology grows by the method of introspection. What the young medical student needs is to get the attitude of the psychologist. He needs to know that there is such a thing as a mental phenomenon."

Dr. Koder: "I believe that there should be greater attention paid to the subject of psychotherapy, and also to psychology of the normal mind; the psychologist should be introduced into the medical faculties to teach his subject as a part of the curriculum of the medical school. It seems to me at least the equal in importance of anatomy and physiology and a part of the time that should be given to psychology may well be carved out from the hours now devoted to the

subjects of anatomy, physiology, *materia medica*, and therapeutics. We devote forty hours to *materia medica*, and we all know that the practising physician uses only two or three dozen remedies and there is no need of overburdening the medical student with the almost useless knowledge of drugs which have little or no value."

Dr. Starr outlined the work that is given in the medical and pre-medical course at Columbia University and said: "If the subject of psychological therapeutics is increasing in importance—and we are appreciating it every day, and that students must be trained along that line—they must obtain a knowledge of physiological psychology which must then be supplemented by some knowledge of pathological psychology." The speaker then spoke of the great value which pathology had been to psychology and suggested further cooperation from both psychologist and physician in research and teaching.

Professor Angell: "I am very much more interested for the moment in the problem of psychology for the general practitioner than in that of the value of psychology for the medical specialist in psychiatry. . . . The rank and file of students are not becoming specialists in psychiatry. In the medical school in Chicago, as a result of my conferences with men of the medical faculty, I conclude that it is desirable that every medical student should have the equipment of an elementary and introductory course in general psychology. . . . I have in mind the aspect of psychology as a science of mental behavior, one dealing with the common affairs of everyday life. . . . A psychology of this functional and dynamic character can be taught without any elaborate terms and this kind of psychology certainly would give the student a point of view for the exploration of the human mind. I can not for a moment believe that the dissecting of the mind would make a physician a better general practitioner. What the physician needs is to consider the living dynamic individual, not the human being of the dissecting table, but the living being who has a developing mind."

Dr. Williams objected to Dr. Prince's course, insisting that "it was putting the cart before the horse," and declared that "some such course as Dr. Watson suggested was absolutely essential."

Professor Münsterberg thought, after listening to the discussion, that the best thing we can do is to teach medical students "a little philosophical foundation for their psychological conceptions."

The upshot of the conference was the appointment of a committee at the business meeting of the association, this committee to represent the association in conferences with similar committees, appointed by the American Medical Association or other medical associations, regarding further discussions of the relation of psychology to medical education. Professors W. D. Scott, E. E. Southard, and J. B. Watson were appointed to this committee.

In his address as president of the Southern Society, Dr. Franz held that it can not be concluded at the present time that the psychic localization is more specific than that mentality is connected with brain activity. We are unable to say that the activity of the cerebrum alone is the concomitant of mental processes. He reviewed the work of Gall, Broca, Flechsig, and the more recent histological studies of localized function. He denied the proof of the relation of the so-called sensory and perceptive areas and showed that there has been no sufficient explanation for the histological differences between the various motor areas. The disorders of speech can not be considered to be associated with definite parts of the brain and there are no facts which warrant a localization of definite mental states in the several layers of the cortex.

At the session on animal behavior three papers were presented on sensory discrimination in mammals. Mr. Johnson reported tests on auditory discrimination in dogs which tended to show that after eliminating all secondary criteria and with the operator removed from the room, the dogs were unable to choose between middle C and the E above, the stimulus being given by the Helmholtz method of "tandem-driven" forks equipped with Koenig resonators, giving practically pure tones. On the basis of these results criticism was offered of the work done by Kalischer and Rothmann and it was held that there was no certain evidence that in any of their experiments were the dogs reacting to tone at all.

Dr. Shepherd reported studies on the discrimination of articulate sounds by cats. The method was to speak a name to which the cat should make a positive response and get food. A cat seven months old learned the reaction in thirteen days and a three-year old cat learned the same reaction in twenty-five days.

Professor Yerkes criticized the experiments on the ground that there had not been sufficient caution to prevent the animals choosing by secondary criteria, unconscious movements of the operator, etc.

Professor Washburn, in reporting some experiments on color vision in the rabbit, gave as a criterion that an animal sees color rather than a gray, the animal's ability to discriminate between a color and any and all brightnesses whatsoever. In the course of experiments in which colored papers were used the rabbit showed some ability to select a door on account of the relative brightness of the paper pinned on it, but the experimenter concluded that the rabbit's hold on this principle, which involves a comparison of two papers, is very unstable. With red and a very dark gray (Hering number 46) four rabbits, which had learned to discriminate red from the lighter grays, failed to make any discrimination whatsoever and there was no evidence that rabbits see red as a color.

The following results regarding the modifiability of behavior in the earthworm were presented by Professor Yerkes: (1) the worms have not acquired the habit of turning directly to the open arm of the T-shaped glass labyrinth and thus escaping to a moist dark tube; (2) certain modifications have appeared during the daily series of trials; (3) there are indications of tracking; (4) the animals fatigue rapidly; five trials per day prove more satisfactory than ten, fifteen or twenty; (5) in so far as the worms learn to follow a direct path through the T, they do so apparently by the use of certain cutaneous sense data rather than by inner kinesthetic data; (6) the first trial each day invariably presents numerous mistakes; (7) there is some indication that the sandpaper becomes a "warning" against the salt which lies beyond it in the arm of the T.

Two experimental studies of the human learning process in the maze were reported. Mr. Boring used the Watson circular maze duplicated on a large scale and two observers who learned the maze made a numerical estimate of the processes involved in the learning, the two reports agreeing in 85 per cent. of the cases. Three phases were noted: the determination of direction after making the turns, guidance within the passage, and the location of the turns. Complete analysis of the first phase only was reported. This involved five factors: attitudinal, verbal, visual, kinesthetic, and automatic. Each of these followed a definite course throughout the learning process, varying somewhat with the ideational type of the learner. Attitudes were of importance in only the first two or three trials. The verbal factor reaches its height very early and the visual later. They both give place to kinesthesia, which, in turn, is resolved into a somatic automatism. The course of learning in this first phase falls into three periods. In the first, attitudes and verbal and visual imagery are advantageous, and the introduction of motor imagery is disadvantageous; in the second period, kinesthesia becomes favorable, while attitudes and verbal and visual imagery become unfavorable; in the third period, automatism predominates and learning is retarded by the introduction of any form of imagery.

Mr. Perrin reported similar work in which he had used two types of maze, a pencil maze and another through which the subject walked. In both cases the subject was blindfolded. The time and error curves were quite comparable with those based on the records of white rats in the maze. The introspection showed, however, so it was claimed, that the learning was essentially that of the human instead of the animal mind, inasmuch as there was evidence of conscious factors, attending, discriminating, judging, inferring, and reasoning. Ideational controls were built up through the play of the cognitive faculties. While the learning curves showed that

learning was by the trial and error method and that the human did not improve upon the time and error records of the rats, they do seem to have the advantage when the conditions are altered as in changing the maze. The human subjects make their adaptations more easily.

In his president's address Professor Seashore spoke on the measure of a singer. He set forth the possible measurements of sensory, motor, associative, and affective powers and argued that technical psychology may be so employed as to furnish qualitative and quantitative classified knowledge about a singer, which knowledge may serve immediate and direct practical purposes. This sort of applied psychology, the speaker thought, will lead to a keener and more penetrating insight into the nature and the conditions of both the individual and his art, and this will result in helpful guidance and a more vital appreciation and respect for the possibilities of the singer and his song. Using the case of the singer as an example, President Seashore went on to emphasize the importance of applied psychology, and in particular, the need for training up experts who will be able to fill the places of consulting psychologists in the various fields that are asking help from psychology.

Quite in the spirit of President Seashore's address the vocational bureau at Cincinnati is trying to be of help—in determining a scientific ground upon which to make recommendations for the employment of children. The work of this bureau, which was reported by Dr. Wooley, is still in the research stage and has planned a five-years' investigation of the children who leave the public schools at the age of fourteen years and a comparative study of other children who remain in school. A thousand children are to be studied in each case. The series of tests include sensation, motor ability, perception, learning power, the use of language, ingenuity. The immediate problem is to determine the value of the tests in use, with the hope that later such tests may be used as criteria of the general or special ability of such persons as come under the bureau's jurisdiction.

Five papers dealing with the learning process were presented. Dr. McGamble reported experiments which showed no correlation between the facility of learning and the tenacity of impression. When longer series of nonsense syllables are learned and relearned at the same rate of presentation, the fraction of the learning time saved in the relearning is greater if the presentation rate is neither very fast nor very slow. When the series are learned at different presentation rates, but relearned at the same rate, the fraction of the learning saved is greater for the series which were originally learned at the slow rate of presentation, unless the absolute learning time of the slow series is very small.

Mr. Lyon in reporting on the same general problem thought that those who learn quickly remember longest where the material used is logical or meaningful in character, but forget quickest where the material is such as involves the memorizing of motor associations, which is generally the case with digits, words, and nonsense syllables. Mr. Lyon agreed with Dr. McGamble that the difference in retentiveness between the fast learner and the slower learner is much less than is generally believed.

Mr. Henmon took issue with the oft-quoted results of Ebbinghaus that the number of repetitions increases at first with great rapidity as the amount to be learned increases and that the increase in repetitions is relatively greater than the increase in the length of the series. Systematic investigation, he held, fails to confirm the law. On the contrary, there is a relative decrease in the number of repetitions as the length of series increases, and an increase in retention after an interval of time. This result holds not only for practised, but also for unpractised, subjects and is most marked with sense material.

Professor Lough gave a partial report of extended studies in habit formation and called particular attention to the absence of plateaus, such as were found by Bryan and Harter some years ago. The complete report of these tests is soon to appear and will cover the study of such factors as practise, fatigue, distribution of repetition, diurnal efficiency, changing keys, sex, age, ability, and individual variation.

Dr. Rall presented some experimental evidence of the transfer of training in memory. As test material, lines from "Evangeline" and nonsense syllables were used. Training material included poetry and prose in English and foreign languages, irregular verbs, and vocabularies. Training period lasted four weeks and was for twenty minutes per day. Results showed wide variation, but in general there was gain in the test given at the end of the training period, amounting in all observers to 32.5 per cent. Control experiment on 28 untrained observers showed a gain of only 17.8 per cent. The results were held to show that there was a transfer of 21 per cent. in learning "Evangeline" and 36 per cent. in the nonsense syllables.

Why certain advertisements fail to force themselves upon our attention, and why certain others arouse our interest so that we read them clear through, is the problem that Mr. Strong has set himself to solve, and a preliminary statement of method was made under the title of the rôle of attention in advertising. The first problem of method indicates that the method of simultaneous presentation of many advertisements gives no valid results, while the successive pres-

entation of the same material gives surprisingly constant results from different subjects. One of the by-products of the investigation so far as completed was that there is no indication of the potency of either primacy or recency when more than ten advertisements are shown successively and then tested for attention-value and memorability by the recognition method; secondly, advertisements are as simple psychically as nonsense syllables, at least as far as attention and recognition enter. This latter fact, Mr. Strong held, was evidence that the simple physically was not the simple psychically, and that it is now time in experimental work to advance from the use of simple to the use of complex material, particularly in the study of esthetics.

Professor Warren challenged our entire system of elementary education in a review of Montessori's method of teaching reading and writing. The Casa dei Bambini, it was held, is an important modification of the kindergarten and is founded upon an accurate knowledge of the ability of children to do certain kinds of work at certain stages of development. In this system the training of touch and the kinesthetic senses are emphasized as important preludes to the teaching of writing, which in turn precedes the teaching of reading proper.

For some years, papers dealing with mental tests and the treatment of defectives have found a place on the general program. At the twentieth meeting a special session was set apart for this aspect of psychology under the title of mental tests. Dr. Fernald discussed a kinetic will test, the device for which was on exhibition in the adjoining apparatus display. The apparatus measures fatigue in terms of units of time. The subject stands on his toes on an indicator which registers the amount of failure to keep the heels clear from the plates. The fluctuation of the heels is registered on a dial before the subject's face and this acts as a stimulus to keep the effort going. The test was applied to 116 reformatory prisoners and to 12 manual-training school students. The disparity of lowest and highest scores is remarkable, *i. e.*,  $2\frac{1}{2}$  and  $52\frac{3}{4}$  minutes in the former group and 12 minutes and  $2\frac{1}{2}$  hours in the latter group, and the difference in the average and median for these two groups is 35 minutes, about twice the average of the reformatory group. No subject involuntarily rested his heels while still striving, but each decided to yield.

Dr. H. H. Goddard described an adaptation board and its use and also discussed the present status of the Binet tests. He reported tests on 400 feeble-minded children, 2,000 normal children, 56 delinquent girls, 100 juvenile court children, 100 children admitted to the Rahway reformatory, and on an entire private school in Penn-

sylvania. Further tests were reported on the insane, and the speaker concluded that "the tests go a long way toward giving us what we want, are accurate far beyond belief. While it is true that they need supplementing and improving, yet it is quite possible that this supplementing will have to be in the nature of a consideration of individual cases and special tests for children. It is a problem that may well occupy the attention of psychologists, but no one should attempt to criticize the tests until he has used them on some hundreds of children."

Dr. Wallin agreed that the Binet tests possess considerable value as an instrument for gauging mental station and classifying groups of mental defectives. He gave methods for testing the accuracy of the scale as follows: (a) Extensive surveys of normal children to ascertain if the age norms are correct; (b) annual tests of the same groups, to determine whether the amount of actual growth corresponds to the growth norms laid down in the scale; (c) the plotting of curves of efficiency or capacity for each age for the various traits tested in the scale.

At this same session Dr. Hollingworth presented a brief account of elaborate experiments on the influence of caffein on mental and motor efficiency. Extensive accounts of these tests have since appeared in the January numbers of *The American Journal of Psychology*, *The Psychological Review*, *The Therapeutic Gazette*, and in the *Archives of Psychology*, *Columbia University Contributions to Psychology*.

The Cornell experiments on the difference between memory and imagination images, reported by Mrs. Perky<sup>1</sup> and generalized in Titchener's recent text-book, received pointed criticism in a paper by Dr. Martin, who, on the ground of experimental evidence, refused to accept the results in question except as having an individual character. The differences between the two kinds of images were not present in Dr. Martin's results, her experiments being made on students and professors at Bonn and Stanford universities.

Professor Washburn reported a new method of studying mediate association, which was defined in the following manner: a process *A* is followed in consciousness by an apparently unassociated process *C*; later it is found that the connection was made by the process *B*, formerly associated with both *A* and *C*, but not at this time appearing in consciousness. The method used was as follows: The observer was given a stimulus word and instructed to react with a wholly unassociated word. 662 experiments were performed and a number of typical mediate associations resulted. A full report of the experiments appears in the January number of the *American Journal of Psychology*.

<sup>1</sup> *American Journal of Psychology*, No. 21, p. 422.

Another paper from the Vassar Laboratory given by Miss Abbott dealt with the effect of adaptation on temperature discrimination. The method was to adapt the right and left hands to temperatures differing by five degrees, and then to test for slightly warmer temperatures. Such adaptation had more effect on the power of discrimination than adaptation to extreme temperatures.

Mr. G. R. Wells reported the results of studies on the relation of reaction time to the duration of auditory stimulus. Five lengths of stimuli were used, viz., 76, 306, 516, 766, and 1066. No characteristic difference was found in the reactions to these different stimuli.

Dr. Reudiger gave the results of a series of experiments made with the Bloch instrument to determine the ability of four subjects to localize 1 gram and 10 gram weights. The surfaces explored were on the forearm and the weights were applied to a vein and to surfaces where no vein was in evidence. Localization was just as accurate with one gram as with ten grams and it was even more accurate on a vein than on other parts of the skin. These facts, the speaker held, were contrary to the sensation-complex theory of space localization, and indicated that space perception on the skin was to be explained on the ground of the sensation-element theory.

An experimental study of self-projection, meaning thereby any explicit form of self-reference, was reported by Professor Richardson, the work being that of Professor Downey. Two chief forms were recognized, the visual and the kinesthetic. Different reagents saw themselves as actors in or spectators of a visualized scene. Kinesthetic or organic self-reference was found to occur frequently and to assume the following forms: (1) objectified and fused with the visual self; (2) oscillating with the visualized self and localized in the body of the subject; (3) objectified and fused with a visualized object or a visualized person other than the self; (4) abstracted from all visual content and objectified or not.

The rôle of the organic factor in the consciousness of meaning was emphasized in the report of experimental work by Professor Murray. The use of an extended imagery questionnaire in a group of elementary students brought out the fact that the organic imagery was accessible to introspection. Such stimulus words as expectancy, impatience, fright, surprise, relief, etc., were used, and definite organic imagery was roughly demonstrated. Further tests with such words as mental, delicate, difficult, mistake, possible, etc., showed that organic and motor imagery claimed an equal share with visual and auditory imagery.

Dr. Starch described a method for the objective measurement of handwriting by means of a celluloid graphometer, which measures the mean variation of the slant letters and their mean deviation from

the base line. These two are reduced to the same units of linear distance and averaged. In this manner all the samples in Thorndike's scale were measured, which showed that the uniformity of letters regularly decreases as the quality decreases.

The relation between the retina and right-handedness was discussed by Professor Stevens in reporting experimental results on the study of the space sense of the retina. His conclusions are as follows: (1) in the horizontal meridian, the right half of an extent in the field of vision is overestimated; (2) this overestimation holds true for both right and left eyes; (3) the extent which is overestimated forms its image upon the left corresponding halves of the two retinas; (4) the left corresponding halves of the retinas are connected exclusively with the left hemispheres of the cerebrum; (5) by reason of the fact of a marked difference in the space sense of the two halves of the retina, those objects in the right half of the field of vision, by appearing larger, attract the visual attention which in turn leads to grasping movements of the right hand. The hand thus favored by the earliest experiences acquires a special skill which causes it to be used in all manual acts requiring the greatest precision.

Professor Magnusson reported experimental data on visual sensations caused by changes in the strength of a magnetic field. The results verified the work of Dunlap and Thompson; ascertained that the magnetic field induced by making and breaking a direct current gives a visual sensation; gave threshold of the sensation in terms of ampere turns and the dependence of the sensation upon the frequency of the current. No sensation other than visual occurred and no after effects were experienced.

Professor Cannon reported the work recently done at the Harvard Medical School on physiological changes attending fear and rage in cats. It was shown that the emotional excitements caused the adrenal glands to pour adrenalin into the blood, and it was thought that this might account for the continued excited state of the body. It was further shown that glycosuris occurred, following the production of adrenalin and the conclusion was that in the wild state the production of sugar furnished new energy and the adrenalin prevented fatigue. In this case these physiological changes would be distinctly useful functions.

Introspection is not only an instrument of psychological investigation, it is also itself a psychological process or group of processes, and as such must be capable of psychological analysis. This was the point of view defended by Professor Dodge in a paper on the nature and limits of introspection. Such an analysis should furnish data for the evaluation of the products of introspection, for an estimate of its reliability as an instrument, and for an estimate of the factors

of mental life that it is best calculated to disclose. The world of things is the result of the integration of sensory experience while introspection furnishes material for the integration of unitary experiences. The phenomena of introspection are not final facts of mental life, but like the phenomena of sound, are indicators for scientific construction.

Professor Dodge also described two new sphygmographic instruments. The first which was demonstrated is a pneumatic photographic recorder of extremely low latency and high sensitivity. Used in connection with any good microscope, it records vibrations of over 1,000 per second, shows overtones of vowels and heart tones, and gives pulse waves of any desired amplitude without changing its latency or other constants. Suitable for class lantern-demonstrations of pulse and plethysmographic changes, it is durable and practically fool-proof, at least for any one who can use a microscope. The second recorder was not demonstrated. It provides for recording the pulse of a distant and active subject by means of a string galvanometer.

Mr. Munsell described his pigment color system and exhibited his books and models and apparatus, including a daylight photometer which attracted considerable attention. Lack of space forbids adequate description here, but extended explanation may be found in *The Psychological Bulletin*.<sup>2</sup>

Apropos of the doctrine of reserve energy, Dr. Williams pointed out that the inhibition of energy is not synonymous with storage and the energy which is not expended so as to be seen by the superficial observer is not merely held in reserve to be set free by therapeutic treatment. What does happen is that the energy is rechanneled, *i. e.*, set going into new directions.

Dr. Burrow objected to the present anatomical, static, bureauological ideas in connection with the definition of neurasthenia, and contended for a more restricted, individual, dynamic interpretation, such as may be yielded through a physiological analysis of a particular case. The conception of functional changes having their basis in disintegrations occurring within the elements of the nervous system so minute as to escape ordinary objective tests he held to be a dodging of issues. He thought rather that important affective trends, obstructed in their natural course, bring about vicarious gratifications in unconsciously motivated reactions, allied with the affective state through somatic associated connections. Such somatic connections are the so-called symptoms of neurasthenia. This point of view, he thought, was supported by the evidence from dreams where there was a close parallel between the imagery of the patient as presented in his dreams and the organic imagery presented in his symptoms.

<sup>2</sup> Vol. 6, No. 7.

Professor Jones, accepting Freud's definition of the term sublimation as "the capacity to exchange an original sexual aim for another no longer sexual aim, though a psychically related one," argued that these discarded desires form the basis of many of our interests and activities in later life and insisted that a fuller knowledge of them would be of the greatest value to education by indicating the most fruitful paths along which sublimation could take place.

That the real cause of emotion is a failure in the mechanics of brain integration, immediately occasioned by the occurrence of factors, inner and outer, that are too difficult of synthesis under the given conditions and to whose action the organism may be abnormally sensitive, was the thesis advanced by Professor Huey in a discussion of emotivity and emotion in their relations to adaptation. The brain, the speaker thought, may be as basal an organ of emotion as the heart, and for many persons, disturbances of the pharynx, bladder, genitals, or skin "mirror the soul" more than do the heart and blood vessels. Emotional expression depends on (1) what functionings are called for by the situation; (2) what functionings happen to be in use at the time; (3) early acquired habits of reacting in a given manner to a given emotional situation; (4) what organs or functions are most enfeebled, these being affected preferably; (5) occurrence of misfit, instinctive functionings of possible utility in race experience; (6) functionings suggested to the individual in the fatigue of emotion, social custom, contagion, or auto-suggestion.

At the business meeting, the committees on mental tests, on teaching experiments, and on periodicals, reported progress and were continued. The following recommendation of the council was adopted: "The council, believing that the members of the association should consider exercising a more direct control over the choice of its officers, recommends the appointment of a committee of three to consider this question, and, in the event of their approving a change in the present arrangements, to submit to the next annual meeting the necessary amendments to the constitution." Professors Aikins, Minor, and Pierce were appointed to this committee.

On the recommendation of the council, Professor Thorndike was elected president for the ensuing year and Professors Margaret F. Washburn and Max Meyer were elected to membership in the council for three years to succeed President Sanford and Professor Thorndike. Professor Seashore, the retiring president, was elected to represent the association on the council of the A. A. A. S.

The next meeting will be held in Cleveland, in affiliation with the American Association for the Advancement of Science, during the Christmas holidays, 1912. The International Congress for the spring of 1913 is abandoned.

M. E. HAGGERTY.